Safe, Non-Corrosive Dielectric Fluid for Stagnating Radiator Thermal Control System, Phase II

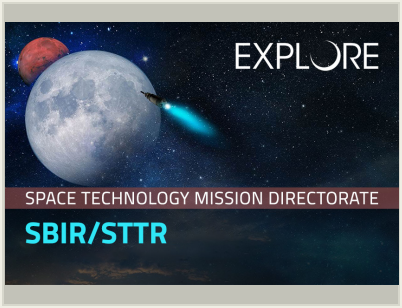
Completed Technology Project (2008 - 2010)

Project Introduction

Paragon Space Development Corporation proposes to develop a single-loop, non-toxic, active pumped radiator design with robust, reliable operation near stagnation regimes as expected to be experienced by NASA's Orion Crew Exploration Vehicle (CEV), the Lunar Surface Access Module (LSAM) and thermal control systems of the Lunar Base at the lunar pole. This will be achieved through an innovative use of a common terrestrial-application, safe fluid that has lower temperature stalling characteristics over typical space-based radiator fluids. Phase 1 has already shown this fluid to stall per predictions and, through a previous contract, Paragon has demonstrated its capability to perform spacecraft heat rejection. The significance of this work is to understand stagnation behavior, both planned and mitigated, and then design and demonstrate a robust and reliable radiator performance based on this knew found knowledge.

Anticipated Benefits

Potential NASA Commercial Applications: Paragon has identified several commercial entities pursuing the development of orbital transportation vehicles and services. As the space industry has grown, commercial applications include not only support of the International Space Station through the Commercial Orbital Transportation Services (COTS) program but also tourism. Specifically, the development work proposed here will address thermal control in low power, cold conditions that occur at such mission phases as long-term docking on the ISS or space hotels. For this reason, initial research indicates that the proposed radiator functionality is highly competitive in the target areas. And in fact, given the strong teaming relationships that Paragon has with industry-recognized companies such as COTS teams Space Exploration Technologies (SpaceX) and Rocketplane Kistler (Paragon is on both teams) and as Bigelow's space hotels, Paragon can readily incorporate this more robust radiator capability as required, increasing the fidelity of the commercial products sooner.



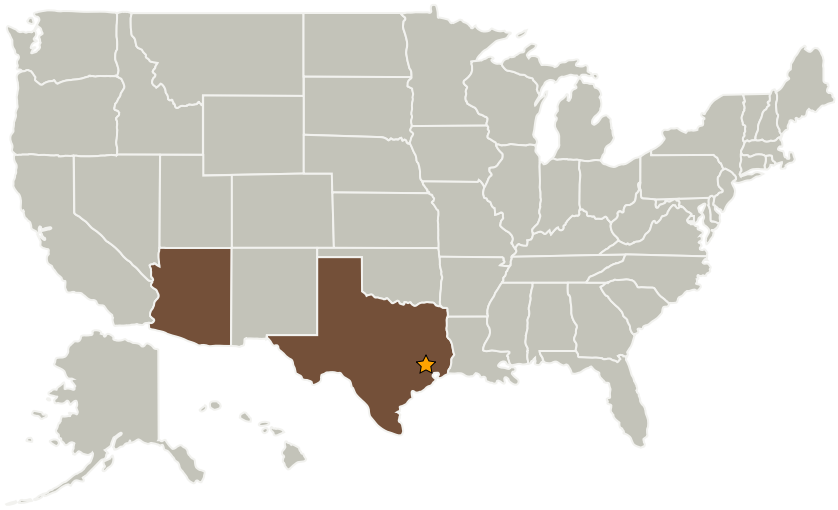
Safe, Non-Corrosive Dielectric Fluid for Stagnating Radiator Thermal Control System, Phase II

Table of Contents

Safe, Non-Corrosive Dielectric Fluid for Stagnating Radiator Thermal Control System, Phase II

Completed Technology Project (2008 - 2010)

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Paragon Space Development Corporation	Supporting Organization	Industry	Tucson, Arizona

Primary U.S. Work Locations	
Arizona	Texas

Project Transitions

June 2008: Project Start

June 2010: Closed out

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

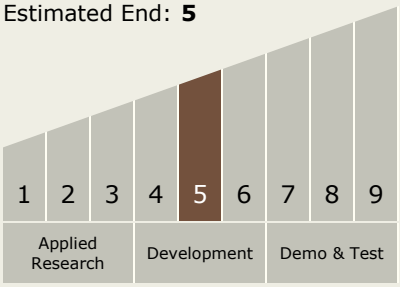
Carlos Torrez

Principal Investigator:

Christine Iacomini

Technology Maturity (TRL)

Current: **5**
Estimated End: **5**



Safe, Non-Corrosive Dielectric Fluid for Stagnating Radiator Thermal Control System, Phase II

Completed Technology Project (2008 - 2010)

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.3 Heat Rejection and Storage